

SECTION 1000

LANDSCAPING

1000.1 GENERAL

This section pertains to the various horticultural and associated installations that are related to street-scapes and parks.

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SECTION 1001
LANDSCAPE IRRIGATION SYSTEM

1001.1 GENERAL:

The work consists of installing a complete underground sprinkler system as shown on the drawings and as specified hereafter. The CONTRACTOR performing this work shall furnish all labor, equipment, materials, and permits necessary for the completion of the system, except those specified to be furnished by others. Unless otherwise specified or indicated on the drawings, or authorized by the ENGINEER. The construction of the sprinkler system shall include the furnishing, installing, and testing of all pipe, fittings, valves, heads, controllers, wires, air release and vacuum valves, backflow preventers inlet and discharge piping, automatic drain valves, manual drain valves, valve boxes, and all other components pertinent to the drawings and specifications of this system. The CONTRACTOR shall perform all trenching, excavating, boring, backfilling, compacting, concrete pouring, electrical work, welding, and any other work necessary for the completion of the project.

1001.2 REFERENCES:

- 1001.2.1 American Society for Testing and Materials (Latest Editions)(ASTM)
- D-1784 Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
 - D-1785 Specification for Poly (Vinyl Chloride)(PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - D-1875 Test Method for Density of Adhesives in Fluid Form
 - D-2241 Specifications for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe
 - D-2466 Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
 - D-2467 Specification for Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, schedule 80.
 - D-2564 Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
 - D-2774 Recommended Practices for Underground Installation of Thermoplastic Pressure Piping
 - D-2855 Recommended Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride)(PVC) Pipe and Fittings.
 - D-3139 Specification for Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals

1001.2.2 This Publication:

Section 1502 - Submittals

1001.3 MATERIALS

1001.3.1 GENERAL:

1001.3.1.1 All materials shall be new and without flaws or defects of any type and shall be the best of their class and kind.

All materials shall have a minimum guarantee of one year against material defects or defective workmanship.

1001.3.1.2 All materials shall be of the brands and types noted on the plans or as specified herein, or approved as equal by the ENGINEER in accordance with Section 6.

1001.3.1.3 For reasons of equipment compatibility, all sprinkler heads, automatic valves and the sprinkler control system shall be of the same manufacturer, unless otherwise noted and approved by the ENGINEER.

1001.3.1.4 The irrigation system was designed around equipment manufactured by specific companies as a standard. Approved as equal equipment by other manufacturers may be used only with the approval of the ENGINEER and the OWNER five days prior to the opening of bids.

1001.3.2 PLASTIC PIPE AND FITTINGS

1001.3.2.1 PLASTIC PIPE:

1001.3.2.1.1 All mainline plastic pipe which is 2" or smaller, shall be Schedule 40 PVC and shall conform to ASTM D 1785. All mainline pipe which is larger than 2" diameter shall be PVC 1120 or 1220 (SDR-PR) pipe, SDR-21 with a 200 psi pressure rating and conforming to ASTM D 2241, with flexible joints conforming to ASTM D 3139. All lateral lines plastic pipe shall be schedule 40 PVC and shall conform to ASTM D 1785.

1001.3.2.1.2 PVC pipe shall be continuously marked with identification of the manufacture, type, class, size and material and shall conform to ASTM D 1784. Solvent joints shall meet ASTM D 2774 and D 2855 requirements. Pipe shall be produced in 20 foot lengths. All plastic pipe shall be continuously and permanently marked with the following information: manufacturer's name, nominal pipe size, schedule, kind of material, kind of pipe, and the pressure rating in psi in accordance with the standards of the National Sanitation Foundation. Pipe shall be free of holes, foreign material, blisters, wrinkles, dents, or sun scald.

1001.3.2.2 PVC Fittings: Fittings on PVC mainlines larger than 2" shall be ring and gasket fittings. Fittings on PVC mainlines 2' in diameter and smaller and on all PVC laterals, shall be Schedule 40 PVC, Type 1, Cell Classification 12454-B, and shall comply with ASTM D 2466, D 2467, and D 1784.

1001.3.2.3 Risers and Threaded Nipples: All threaded PVC nipples and risers shall be Schedule 80 PVC pipe. All galvanized nipples and risers shall be Schedule 40 galvanized steel pipe.

1001.3.3 VALVES AND VALVE BOXES:

1001.3.3.1 Valves: Valves for use in electrically controlled automatic control systems shall be diaphragm activated and hydraulically operated solenoid valves as specified on the plans.

1001.3.3.2 Valve Boxes: Valve boxes shall be as specified on the plans.

1001.3.4 SPRINKLER HEAD AND BUBBLERS: Sprinkler heads and bubblers shall be as specified on the plans and shall be installed on schedule 80 PVC threaded risers.

1001.3.5 CONTROLLERS: Controllers shall be as specified on the plans.

1001.3.6 BACKFLOW PREVENTER: The backflow prevention device shall be as specified on the plans.

1001.3.7 CEMENTS, CLEANERS/PRIMERS AND JOINT COMPOUNDS:

1001.3.7.1 Cement shall be No. 2200 series Uni-Weld or Rectorseal Gold low temperature plastic pipe cement or approved equal for use on all sizes and schedules of PVC pipe and fittings. Cement must be NSF approved and meet ASTM D 2564 specifications.

1001.3.7.2 Cleaner/primer shall be No. 8700 United Elchem hi-etch cleaner/primer or approved equal. Cleaner/primer must be any color other than clear.

1001.3.7.3 All threaded connections between PVC and metal pipe shall be made using Rectorseal No. 100 virgin heavy duty sealing past of plasto-joint stick as manufactured by Lake Chemical company or teflon tape.

1001.3.7.4 All metal to metal connections shall be made using Rectorseal No. 5, slow dry, soft set pipe thread compound or approved equal. All PVC to PVC threaded connections shall use teflon tape.

1001.3.7.5 "O"-ring gasket and pipe spigot ends shall be lubricated using the lubricant recommended or supplied by the pipe manufacturer. If the pipe manufacturer does not provide a lubricant for the pipe, use IPS Weld-On No. 787 gasket lube as manufactured by Industrial Polychemical Service or approved equal.

1001.3.8 WIRE(120 VOLTS): Wire for the 120 volt wiring shall be solid copper (or stranded copper in larger wire sizes) underground feeder for direct burial and PVC insulated. Size of wire shall be No. 12 AWG.

1001.3.9 WIRE(24 volts): Wire for the 24 volt wiring shall be solid copper wire, PVC insulated, UL approved underground feeder wire for direct burial in ground. Common wires shall be No. 12, white, except as noted on drawings. The wire shall be

supplied in either 500 feet or 2,500 feet rolls.

1001.3.10 WIRE SPLICING MATERIALS: All wire splices shall be made watertight using 3M Scotchlok wire connectors or approved equal. All wiring installed under sidewalks, roadways, parking lots, etc., shall be installed in a 1 1/4 inch or larger Class 200 PVC sleeve.

1001.3.11 OTHER MISCELLANEOUS FITTINGS AND MATERIALS: All other miscellaneous fittings and materials shall be as specified on the plans.

1001.4 SUBMITTALS AND RECORD DRAWINGS

1001.4.1 SUBMITTALS: The CONTRACTOR shall submit all material and/or information as specified in Section 1502 of the Supplemental Technical Specification or as required by the ENGINEER in accordance with Section 6 of these specifications.

1001.4.2 RECORD DRAWINGS:

1001.4.2.1 The CONTRACTOR in conjunction with the ENGINEER, shall provide and keep up to date a complete set of "as-built" drawings which shall be corrected daily to show all changes in the location of sprinkler heads, controllers, backflow preventers, valves, drains, meters, points of connection, wire splice points, pipe and wire routing and other changes that may have been made from the original drawings and specifications as provided to him. All gate valves, manual drains, wire splices, automatic and manual valve locations, controllers, power supply, and mainline piping shall be shown with actual measurements to reference points so they may be easily located in the field.

1001.4.2.2 At the time of final acceptance the CONTRACTOR shall furnish to the OWNER a reproducible "as-built" record drawing(s) prepared by a qualified drafts-person showing the entire completed irrigation system. The CONTRACTOR shall also provide and install in each of the controller vaults on the project a legible reduction, laminated in plastic, layout drawing of the irrigation system that the controller operates.

1001.5 PREPARATION AND INSTALLATION FOR IRRIGATION SYSTEM:

1001.5.1 GENERAL:

1001.5.1.1 All materials and equipment shall be installed in a neat and workmanlike manner according to manufacturer's published recommendations and specifications, local, and state codes, as shown on the detail drawings, plans and as specified herein.

1001.5.2 PRODUCT HANDLING: The CONTRACTOR shall be responsible for correct procedures in loading, unloading, staking,

transporting, and handling all materials to be used in the system. The CONTRACTOR shall avoid rough handling which could affect the useful life of equipment. Pipe shall be handled in accordance with the manufacturer's published recommendations on loading, unloading, and storage.

1001.5.3. EXCAVATION AND TRENCHING:

1001.5.3.1 The CONTRACTOR shall stake out the location of each run of pipe and all sprinkler heads and valves prior to trenching. Each run of the system shall be approved by the ENGINEER before actual installation is started. Prior to trenching the Contractor shall contact the New Mexico One Call, 260-1990, two (2) working days in advance of any excavation.

1001.5.3.2 Excavation and trenching for pipe lines shall be true to line. The width of the trenches shall not be greater than necessary to permit proper jointing, tamping, backfilling, bedding or any other installation procedures that may be necessary. Trench widths shall also be wide enough so that there will be a minimum horizontal separation of 4 (four) inches between pipes in the same trench.

1001.5.3.3 In areas where trees are present, trench lines will be adjusted on the site to install trenches beyond the drip line of the tree.

1001.5.3.4 Trench depths shall be sufficient to provide the specified pipe cover as described in these specifications or as noted on the plans. In rocky areas the trenching depth shall be 6 (six) inches below normal trench depth to allow for pipe bedding as described in these specifications.

1001.5.4 DEPTH OF BURY: There shall be a minimum of 28" and a maximum of 30" of cover for all constant pressure mainline. There shall be a minimum of 18" and a maximum of 20" of cover for all mainline located downstream of the master valve. There shall be a minimum of 18" and a maximum of 20" of cover for all lateral lines.

1001.5.5. PIPE AND FITTINGS:

1001.5.5.1 Installation of plastic pipe and fittings shall be in accordance with the manufacturer's published recommendations and procedures and as specified herein. Manufacturer's published recommended procedures for making solvent weld fittings shall be strictly adhered to.

1001.5.5.2 Caution shall be exercised by the CONTRACTOR in handling, loading, unloading and storing of PVC pipe and fittings. All PVC pipe shall be stored and transported in a vehicle with a bed long enough to allow the pipe to lie flat without subjecting it to undue bending or concentrated external load at any point.

Any section of pipe that has been dented or damaged or in any other way found to be defective, either before, or after laying shall be replaced with sound pipe without additional expense to the OWNER.

1001.5.5.3 Before installation, the inside of the pipe shall be cleaned of all direct and foreign matter and shall be kept in cleaned condition during and after laying of the pipe. When work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth or other foreign substances will enter the pipe or fittings. Where pipe ends are left for future expansion or connections, they shall be valved and capped, as directed on the plans and or by the ENGINEER.

1001.5.5.4 All PVC pipe and fittings shall be assembled to permit the pipe or fittings to be joined at the true parallel position of the fitting. Placement of pipe in curving trenches which causes bending and stress on pipe and fittings will not be permitted. No excess piping or fittings shall be permitted in the installation of the system, which may increase pressure loss or potential blockage.

1001.5.5.5 Excavation and trenching shall be true to line and depth specified in these specifications or indicated on the plans. Before installing the pipe, all rubbish and rocks shall be removed from the trenches. If the soil is extremely rock, the trenches shall be padded with dirt or sand as outlined in these specifications. Material used for pipe padding shall be approved by the ENGINEER. The full length of each section of the pipe shall rest solidly upon the bottom of the trench or bedding material.

1001.5.5.6 Pipe shall not be laid in water or when trench or weather conditions are unsuitable for the work. Any water which may be encountered or may accumulate in the trenches or excavation shall be pumped out or otherwise removed as necessary to keep the bottom of the trench or excavation free and clear of water during the progress of the work.

1001.5.5.7 PVC pipe will expand or contract at the rate of 1 (one) inch per 100 feet per 10 degrees F change in temperature. Therefore, the pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

1001.5.5.8 Unless otherwise specified on the plans, all piping passing under sidewalks, roadways, parking lots, etc., shall be sleeved in a Class 200 PVC pipe two sizes larger than the pipe to be sleeved.

1001.5.5.9 When more than one pipe is installed in the same trench, in no case shall one pipe be installed above or below

another. Pipe can be installed in the same trench if pipes are laid side by side. In no case shall mainline and lateral pipe be installed in the same trench.

1001.5.5.10 The minimum horizontal clearance between lines in the same trench shall be 4 (four) inches.

1001.5.5.11 After all sprinkler piping, risers, valves, thrust blocks, etc., have been installed and partial backfilled as specified herein, the control valve shall be opened and a full head of water used to flush out the system. After the system is thoroughly flushed, risers shall be capped off and the system pressure tested in accordance with the testing section. At the conclusion of the pressure test the heads shall be installed and the backfill operation completed.

1001.5.6 SOLVENT WELDING PROCEDURE:

1001.5.6.1 PVC plastic pipe shall be squarely cut.

1001.5.6.2 Burrs left from cutting shall be wiped off with a clean, dry cloth.

1001.5.6.3 Utilizing a cleaner/primer, thoroughly clean the mating pipe end and the fitting socket with a clean dry cloth.

1001.5.6.4 Apply a uniform coat of solvent cement to the outside of the pipe end with a non-synthetic brush or dauber.

1001.5.6.5 In like manner, apply a thin coating of solvent cement to the inside of the fitting socket.

1001.5.6.6 Re-apply a light coat of solvent cement to the pipe and quickly insert it into the fitting to the full depth of the fitting socket.

1001.5.6.7 Rotate the pipe or fitting approximately 1/4 turn to insure even distribution of the solvent cement.

1001.5.6.8 Hold in position for approximately 30 seconds.

1001.5.6.9 Wipe off any excess solvent cement that forms as a bead around the outer shoulder.

1001.5.6.10 Care should be taken so as not to use an excess amount of solvent cement that could cause burrs or obstructions to form on the inside of the pipe joint.

1001.5.6.11 Solvent weld joints shall be allowed to cure for at least 24 hours before pressure is applied to the system.

1001.5.7 BACKFILLING:

1001.5.7.1 Upon completion of a particular section of the irrigation system, and after sufficient time has elapsed for the curing of solvent weld joints, partial backfilling

can begin, leaving all joints, risers and connections exposed for visual inspection during the hydrostatic test. After completion and acceptance of the hydrostatic test by the ENGINEER for a particular section of the irrigation system the backfill operation can be completed.

1001.5.7.2 All backfill material shall be subject to approval by the ENGINEER. Backfill materials shall be free from rubbish, rock, large stones, brush, sod, frozen material or other unsuitable substances that may damage pipe during the backfilling operations.

1001.5.7.3 In the event that the material from the excavation or trenching is found to be unsuitable for use in backfill, it shall be removed from the site and properly disposed of by the CONTRACTOR and at his own expense. The CONTRACTOR shall then, at no additional cost to the OWNER, arrange for, purchase and/or furnish suitable backfill material consisting of earth, loam, sandy clay, sand, or other approved materials free of large clods of earth or sharp stones, approved by the ENGINEER.

1001.5.7.4 In rocky areas, the trench depth shall be 6 (six) inches below the normal trench depth to allow for 6 (six) inches of suitable backfill as padding for the pipe. In like manner, there shall be at least 6 (six) inches of padding on either side of the pipe as a padding against the rock wall of the trench.

1001.5.7.5 Backfill shall be placed in horizontal layers not exceeding 6 (six) inches in depth and shall be thoroughly tamped, rolled or otherwise compacted to original density or better so that no settling will result. Backfill shall be placed to the original ground level or to the limits designated on the plans. If settlement of trenches occurs within one year from date of completion, it shall be the CONTRACTOR'S responsibility to refill trenches and re-seed or sod the repaired areas.

1001.5.8 SADDLE TAPS: No saddle taps shall be permitted.

1001.5.9 SLEEVED CROSSING:

1001.5.9.1 Unless otherwise noted on plans, all piping installed under sidewalks, roadways, parking lots, etc., shall be sleeved in a Class 200 PVC pipe two sizes larger than the pipe to be sleeved. Wiring shall be placed in a separate sleeve from that of the pipe crossing and shall be 1 1/4 or larger Class 200.

1001.5.9.2 Every effort shall be made by the CONTRACTOR to install sleeving prior to the pouring or construction of the sidewalks, roadways, parking lots, etc., if at all possible. If prior sleeving is not possible, all crossings must be bored

unless authorization for an open cut is obtained from the ENGINEER.

1001.5.9.3 Sleeving ends, with the inner pipe or wire installed, shall be taped closed using a good quality duct tape to prevent the entrance of dirt into the sleeve.

1001.5.9.4 Arroyo crossings, if necessary, shall be sleeved in a Class 200 PVC pipe two sizes larger than the pipe to be sleeved and shall be installed a minimum of 36 inches below the flow line of the arroyo.

1001.5.10 THRUST BLOCKS: Concrete thrust blocks shall be provided where necessary to resist system pressure. Thrust blocks shall be constructed at all direction changes, size changes, valves and terminations, or at any other points of the system that will result in an unbalanced thrust line for equipment 2 (two) inches and larger. Do not obstruct the outlets of fittings which are intended for future connections. Thrust blocks shall be poured against undisturbed earth and in accordance with the plans or standard details.

1001.5.11 SPRINKLER HEADS:

1001.5.11.1 Sprinkler heads shall be the type and make specified and shall be installed to grade unless otherwise specified. Sprinkler heads shall be installed a maximum of 2 (two) inches from curbs, walls, driveways, building walls, etc.. Heads shall be installed in the vertical positions, hand backfilled and compacted to original density or better.

1001.5.11.2 Sprinkler head spacing shall not exceed the spacing shown on the plans and shall be in the approximate locations and configuration as shown on the plans. CONTRACTOR shall verify area dimensions while staking sprinkler head location. Sprinkler heads shall be spaced so that they are equidistant from one another for the given lengths and widths of the area to achieve uniform coverage.

1001.5.11.3 After all piping and risers are in place and connected and before installation of the sprinkler heads, all control valves for a given section shall be fully opened and a full head of water shall be used to flush out the system.

1001.5.11.4 If water pressure without the heads installed is not sufficient to provide adequate water flow from end risers, the CONTRACTOR shall cap off enough heads closest to the water source to provide adequate flushing of the end riser assemblies.

1001.12 CONTROLLER:

1001.12.1 The Controller location is indicated on the plans. The CONTRACTOR shall familiarize himself with the

requirements of making the power connections at the locations noted (120 volt supply to the controller) and shall include the cost to complete this portion of the contract.

1001.5.12.2 The controller shall be mounted and wired according to the manufacturer's recommended procedures and as specified in these specifications and on the plans.

1001.5.12.3 Electric control valves shall be connected to controller in the numerical sequences as shown on the plans.

1001.5.12.4 Controller shall be installed in a locking controller enclosure as specified on the plans.

1001.5.13 ELECTRIC CONTROL VALVES:

1001.5.13.1 All electric control valves shall be of the type and size as indicated on the plans and shall be installed where shown on the plans, following the published recommendations of the manufacturer and in accordance with these specifications and plans.

1001.5.13.2 The valve boxes shall be locking and of the size and type as shown on the plans. Valve boxes shall be installed as shown on the plans.

1001.5.13.3 Valve wire splices shall be waterproofed using 3M Scotchlok Connectors or approved equal and the CONTRACTOR shall leave 24 (twenty-four) inches of coiled slack to facilitate raising splices to ground level without cutting wires.

1001.5.14 24 VOLT CONTROL VALVE WIRING:

1001.5.14.1 All wire installation procedures as described herein shall be checked to conform to local electrical codes.

1001.5.14.2 All wire used for the 24 volt wiring from the controller to the electric control valves shall be type "UF", 600 volt, solid copper, single conductor, PVC insulated and bear UL approval for direct burial underground feeder cable. Unless otherwise specified on the plans, the 24 volt common wires shall be wire No. 12 A.W.G. and the remaining 24 volt control wires shall be No. 12 A.W.G., and of colors other than white. These colors shall be noted on the "as-built" record drawings.

1001.5.14.3 Whenever possible, the CONTRACTOR shall install the 24 volt control valve wiring in the same trench as the sprinkler system mainline piping. All wires shall be laid on the bottom on one side of the pipe only and 2 (two) inches below the pipe. The wires shall be laid loose in the trench to allow for contraction of the wire. Control wires shall be taped together in 10'0" increments. When trenches used for piping

are not appropriate for routing of wire, a trench, 18" deep, shall be provided by the CONTRACTOR for 24 volt wires and shall be identified with dimensions on the "as-built" record drawings.

1002.5.14.4 Wire splices, other than at valve box locations, shall be kept to a minimum and if needed shall be made only at common splice points and placed in a wire splice box as shown on the plans or as approved by the ENGINEER. The location of these wire splice boxes shall be shown on the "as-built" record drawings. There shall be a 24" coil in the wires placed in the wire splice boxes so that the splices can be pulled out above ground level to facilitate testing and trouble shooting. No buried wire splices shall be permitted. All wire splices shall be made waterproof using 3M Scotchlok Connectors or approved equal.

1001.5.14.5 In no case shall wires of different colors be spliced together.

1001.5.14.6 Control wires shall be identified with E-Z Coder WDR Series Tape at each valve and at the Controller and at splices. Valves shall be numbered on the "as-built" record drawings.

1001.5.15 120 VOLT CONTROLLER POWER WIRING:

1001.5.15.1 The CONTRACTOR shall familiarize himself with the work required to complete this portion of the installation. All 120 volt wiring shall be installed in accordance with local electrical codes. The 120 volt service shall consist of one black and one white wire. The neutral wire must be bonded.

1001.5.15.2 120 volt power shall be supplied to the controller location by a licensed electrician.

1001.5.16 MANUAL DRAIN VALVE-MAINLINE:

1001.5.16.1 Manual drain valves of the size and type indicated on the plans shall be installed at all low points of mainline piping, or at any other points that may be indicated on the irrigation system plans or as specified herein.

1001.5.17 TESTING:

1001.5.17.1 Upon completion of the irrigation system's mainline, the entire mainline shall be tested for a 4 (four) hour period at 150 psi. Prior to testing the mainline shall be partially backfilled leaving all joints and connections exposed for visual inspection. All dirt shall be flushed from the system and the line filled with water to remove air. The mainline shall be brought to static pressure. A pressure gauge and temporary valve shall be installed at the end of the mainline to permit hydrostatic pressure to be applied to the main. A pressure of 150 psi must be retained for a 4 (four) hour period. Any

leaks resulting in the 4 (four) hour pressure test shall be repaired and the system retested until the system passes the test.

1001.5.17.2 Upon completion of the irrigation system's lateral sections and after sufficient time has been allowed for solvent weld joints to cure, the entire system shall be hydrostatically tested by capping off all sprinkler head risers. On systems using flex nipples, or swing joints, the lateral line shall be tested prior to installation of the flex nipples or swing joints. Prior to capping, all air and dirt shall be flushed from the system and the pipe partially backfilled by center loading, leaving all joints, risers, swing joints and connections exposed for visual inspection. All lateral irrigation piping must be pressure tested for 1 (one) hour at 100 psi. The procedure shall be the same as used for the mainline. If after one hour no visible leakage has occurred and the 100 psi pressure has been retained, the heads shall be installed, and the backfill operation completed. Any leaks resulting from the hydrostatic test shall be repaired and the system retested until the system passes the test.

1001.5.18 ADJUSTING OF SYSTEM:

Upon completion of the installation, the CONTRACTOR shall adjust all heads and valves and program controller to provide optimum sprinkler system performance. It will be the OWNER'S responsibility to make any minor adjustments to the system during the guarantee period.

1001.5.19 CLEAN UP: The CONTRACTOR shall continuously keep a neat and orderly area in which he is installing the system. Disposal of rubbish and waste material resulting from the installation shall be continual. Upon completion of the system, the CONTRACTOR shall remove from the OWNER'S property at his own expense, all temporary structures, rubbish, waste material, tools, and equipment resulting from or used in the installation of the system.

1001.5.20 PROTECTION OF EXISTING UTILITIES: The CONTRACTOR shall be responsible for locating all cables, conduits, piping, and any other utilities or structures that may be encountered either above or below ground. All necessary precautions must be taken by the CONTRACTOR to prevent any damage to these existing improvements. In the event that such damage should occur from his operations, the CONTRACTOR shall repair or replace or bring to original condition the damaged utilities or improvements at his own expense.

1001.5.21 ROCK: If the CONTRACTOR encounters rock or other unfavorable trenching conditions, no additional compensation will be paid. When material

from the excavation or trenching is unsuitable for use as backfill, additional backfill material suitable for this purpose and approved by the ENGINEER, shall be brought in at the expense of the CONTRACTOR. It shall also be the CONTRACTOR'S responsibility to remove and dispose of all unsuitable materials removed from the trench that cannot be used in the backfill operation.

1001.5.22 FINAL ACCEPTANCE:

1001.5.22.1 When the CONTRACTOR is satisfied that the system is operating properly, that it is balanced and adjusted, that all work and cleanup is completed, he shall request an inspection of the irrigation system by the ENGINEER and OWNER. At that time, the CONTRACTOR shall demonstrate each system in its entirety. In inspecting the work, no allowance for deviation from the original plans and specifications will be made unless prior approval has been obtained. This system review must be completed prior to beginning planting operations.

1001.5.22.2 Any inconsistencies to the specifications shall be noted by the ENGINEER and the OWNER and a written copy of corrections needed shall be given to the CONTRACTOR. Any work deemed not acceptable shall be reworked to the complete satisfaction of the OWNER and the ENGINEER at no additional cost to the OWNER.

1001.5.22.3 When all work is completed to the satisfaction of the OWNER, a written acceptance of the total project will be given to the CONTRACTOR upon furnishing, by the CONTRACTOR of a complete "as-built" record drawing of the irrigation system that is acceptable to the OWNER.

1001.5.23 OPERATIONAL INSTRUCTION: After the system has been tested and accepted, the CONTRACTOR, along with the ENGINEER shall instruct the OWNER in the operation and maintenance of the system.

1001.5.24 SYSTEM MAINTENANCE AND WARRANTY:

1001.5.24.1 For a period of one year from final acceptance of the system, the CONTRACTOR will promptly furnish and install, without cost to the OWNER, any and all parts or materials which prove defective in material or workmanship. All damage due to irrigation system line breaks caused by defective material or workmanship shall be repaired and brought to original condition by the CONTRACTOR at no expense to the OWNER. The CONTRACTOR shall complete all repairs within 24 hours of receipt of notification from the OWNER of system failure.

1001.5.24.2 Minor maintenance of the system shall be the responsibility of the OWNER.

1001.5.24.3 For a period of one year from final acceptance of the system, the CONTRACTOR shall repair any settlement of the trenches by one of the following methods as directed by the ENGINEER and the OWNER.

1001.5.24.3.1 Bring to grade by top dressing (raking top soil into the grass).

1001.5.24.3.2 Bring to grade with top soil and seed.

1001.5.24.3.3 Remove existing sod, fill depression with top soil, and replace with new sod to match existing sod.

1001.5.24.4 Repair by any of the above methods must result in a smooth, level area. Maintenance of repaired areas shall be the responsibility of the OWNER. Repair shall be completed by the CONTRACTOR within 48 hours after notification from the OWNER of trench settlement problems.

1001.6 INSPECTIONS

1001.6.1 The following inspections shall be the minimum required inspections during the course of construction. Additional inspections shall be made at any time at the discretion of the ENGINEER or OWNER. It shall be the responsibility of the CONTRACTOR to notify the ENGINEER in writing 48 hours in advance of each required inspection. The sequence of required inspection shall not be changed from the sequence listed below. The CONTRACTOR shall not proceed with work in the next sequence without written approval of the previous sequence. Payment will not be approved for items which have not been inspected and approved in writing.

1001.6.1.1 Inspect staked locations of mainline, valves, laterals, and sprinkler heads.

1001.6.1.2 Inspect 24 volt control wire installation.

1001.6.1.3 Inspect and pressure test mainline and electric control valve installation.

1001.6.1.4 Inspect and pressure test lateral irrigation line installation.

1001.6.1.5 Inspect automatic controller installation and operation.

1001.6.1.6 Inspect sprinkler and bubbler head placement, coverage and operating pressure prior to planting.

1001.6.1.7 Final project inspection and acceptance.

1001.6.1.8 Inspect at end of the maintenance period.

1001.7. MEASUREMENT AND PAYMENT

1001.7.1 Measurement of the landscape irrigation system shall be lump sum or by units of the major components of the system as specified in the Supplemental Technical Specifications and/or the Bid Proposal and shall include the entire irrigation system from the water meter.

1001.7.2 Payment shall be at the contract price per lump sum or per unit as specified in the Supplemental Technical Specifications and in the Bid Proposal, which shall include all material, equipment and labor required to install and make operational the irrigation system.

SECTION 1005

PLANTING

1005.1 GENERAL:

1005.1.1 SCOPE: Work under this section consists of the planting of trees, shrubs, and groundcovers, including the furnishing of all labor, equipment, and materials and performing all work in connection therewith in accordance with the plans and specifications, or as authorized by the ENGINEER.

1005.1.2 The scientific and common names used for the plants called for on the drawings are generally in conformity with the approved names given in Standardized Plant Names, 1942 Edition published by the American Joint Committee on Horticultural Nomenclature. The names of varieties not included therein are generally in conformity with the names accepted in the nursery trade.

1005.2 REFERENCES:

1005.2.1 U.S.A. Standard for Nursery Stock, published by Committee on Horticultural Standards of the American Association of Nurserymen, Inc.

1005.2.2 Standardized Plant Names, published by the American Joint Committee on Horticultural Nomenclature.

1005.3 MATERIALS:

1005.3.1 PLANT MATERIALS: A complete list of plants, including a schedule of quantities, sizes and other requirements is shown on the plans. In the event that discrepancies occur between quantities of plants indicated in the schedule of plants and the planting plan, the plant quantities indicated on the planting plan shall govern.

1005.3.2 PLANT MATERIAL SUBSTITUTION:

1005.3.2.1 Plant material substitutions shall not be made without the written approval of the ENGINEER. The use of materials differing in kind, quality, or size from that specified will be allowed only after the ENGINEER is convinced that all means of obtaining the specified materials have been exhausted. At the time bids are submitted, the CONTRACTOR is assumed to have located the materials necessary to complete the job as specified. All requests for substitutions must be submitted no later than five days prior to the opening of bids.

1005.3.2.2 Plant material quality, size, and condition shall be in accordance with U.S.A. Standard for Nursery Stock, latest edition, as published by the Committee on Horticultural Standards of the American Association of Nurserymen, Inc., the plans and the following requirements:

1005.3.2.2.1 All plants shall be typical of their species or variety. All plants shall have normal, well developed branches and vigorous root systems. They shall be sound, healthy, vigorous, free from defects, disfiguring knots, abrasions of the bark, sunscald injuries, plant diseases, insect eggs, bores, and all other forms of infections.

1005.3.2.2.2 Unless otherwise stated on the plans or approved by ENGINEER, all plants shall be nursery grown and shall be tagged with nursery labels indicating species and variety.

1005.3.2.2.3 Container grown plant material shall have been established in its delivery container for not less than six months, but for not more than two years. Any rootbound material will not be accepted.

1005.3.2.2.4 Balled and burlapped plant material shall have a solid ball of earth of minimum specified size and held in place securely by burlap and a stout twine or rope. Broken or loose balls will be rejected.

1005.3.2.2.5 Unless specifically noted on the plans, all trees shall have a single trunk that is straight and free of "dog-legs," "crooks," "y-crotches," or other disfiguring shapes. The central leader of all trees shall not have been pruned. Trees with double leaders are not acceptable.

1005.3.2.2.6 All plant material shall have a uniform shape around its complete circumference. Plant material with irregular branching patterns or with branching patterns more highly developed on one side than on other sides shall not be acceptable.

1005.3.2.2.7 The ENGINEER shall inspect all plant material at the CONTRACTOR'S yard prior to delivery to the job site. All materials shall then be inspected at the job site prior to planting and after planting.

1005.3.2.2.8 At the option of the CONTRACTOR the ENGINEER will inspect plant material at a wholesale nursery of the CONTRACTOR'S choice prior to delivery of materials to the CONTRACTOR'S yard. However, at no additional expense to the OWNER, the CONTRACTOR shall be responsible for all travel expenses incurred by the ENGINEER for any travel outside the Albuquerque Metropolitan Area.

1005.3.2.2.9 The ENGINEER shall be the judge of the quality and acceptability of all plant materials. All rejected material shall be immediately removed from the site

and replaced with acceptable material at no additional cost to OWNER.

1005.3.3 PLANTING SOIL MIXTURES:

Specification for complete planting backfill. Planting soil mixture shall be a premixed, homogeneous soil. It will consist of sand and organic matter and meet performance characteristics outlined below.

Sand, 60% by volume of clean masonry sand with a sieve analysis of:

<u>sieve size</u>	<u>% passing</u>
3/8"	100%
#4	93-99%
#8	82-88%
#16	73-79%
#30	55-61%
#50	24-30%
#100	6-12%
#200	7-2%

Organic Matter, 40% by volume of compost material specified as follows:

Compost, or mulch, shall be a combination organic carbon sources such as straw, hay, bark, sawdust or wood shavings and nitrogen sources such as manure, blood meal, or chemical fertilizers. Nitrogen sources must be added prior to composting. It is recommended this mixture be aerobically composted at temperatures between 120 F and 160 F for a period of not less than 100 days. Weed seeds are to be destroyed during composting and urea and ammonia form nitrogen ratio shall be as listed below. Finished compost is to be screened to provide less than 2% remaining on a 1/2" screen. Carbon to Nitrogen Ratio of organic matter shall be less than 50 parts carbon to one part nitrogen.

1005.3.3.1 The complete PLANTING SOIL MIXTURE shall have the following characteristics:

Calcium to magnesium ratios shall not exceed 20 parts calcium to one part magnesium.

Potash (Potassium)(K) shall be present at a rate of at least 200 parts per million of exchangeable potassium.

Salinity (EGXK) not to exceed 2 AMHOS/CM Nitrate nitrogen (NO3-N) shall be present at a rate of at least 30 parts per million.

Phosphorus as measured by the Olson sodium bicarbonate measurement method shall be at greater than 25 parts per million.

Ph of the planting soil mixture shall be between 6.5 and 7.5. Organic matter by weight (by simple combustion) shall be more than 5%. Available moisture capacity in the one third to 15 bar tension shall be greater than 15%.

TKN2 or Total Kjeldahl Nitrogen shall

be 250 ppm or greater.

NH4 shall be 25 ppm or less.

1005.3.3.2 The ENGINEER reserves the right to adjust the above characteristics and waive all irregularities.

1005.3.3.3 The PLANTING SOIL MIXTURE shall be tested by the CONTRACTOR at an approved solid testing laboratory. Test results shall be submitted to and approved by the ENGINEER prior to delivery of the planting soil mixture. Test Results shall list the as tested qualities of the above characteristics and any recommendations the testing Lab has.

The OWNER will also test the final product as delivered or installed to verify the mixture matches the listed characteristics and the submitted solid report.

Approved Soil Testing Laboratories are:

IAS(Inter Ag Services)
2643 East University Drive
Station 113
Phoenix, Arizona 85034
(602)273-7248
or
ASSAGAI Labs
P.O. Box 90430
Albuquerque, N.M. 87199-0430
(505)345-8964

1005.3.3.4 Potential sources for compost and the PREPARED SOIL MIXTURE is:

WAPCO
RR9, Box 862
2nd and Bates Rd., SW
Albuquerque, N.M. 87105
(505)877-8670

1005.3.3.5 Each Delivery shall have a load ticket. The load ticket shall list:

Source of Mixture.

Approximate volume of load.

Date of delivery or loading.

Typed name of individual representing the source.

Inked original signature of individual representing the source.

Area of site product delivered to.

Tickets shall be collected and provided to the ENGINEER.

1005.3.4 MULCH: Bark mulch shall be fresh, shredded mixture of 1/2" - 5" pieces of wood, cambium and bark nuggets from coniferous trees, as available from Western Agricultural Products Company or approved equal.

1005.4 PLANTING OPERATIONS:

1005.4.1 Planting operations as specified herein shall begin only when other work including placing of topsoil to finished grade has progressed sufficiently to permit planting and shall be performed only during favorable weather conditions in accordance with accepted practice.

1005.4.2 In any one day, only those plant materials intended to be planted that day shall be delivered to the project site, unless otherwise approved by ENGINEER. All plant materials shall be located where shown on the plans except when adjustments due to field conditions are required. The location of all trees and shrubs shall be staked by the CONTRACTOR before making any excavations, and locations shall be inspected by the ENGINEER prior to installation. All plants shall be placed as specified except for minor adjustments made necessary by underground obstructions or other unforeseen causes.

1005.4.2.1 All balled and burlapped plant materials shall be planted between March 1 and June 1.

1005.4.3 PLANTING: All planting and backfilling shall be performed in accordance with accepted nursery practice, the plans, and the following requirements:

1005.4.3.1 Prepare all planting pits and planting beds as shown on the plans. Set all plants plumb and straight unless otherwise indicated on plans and in the center of pit such that the top root ball sits flush with finish grade. No filling will be permitted around trunks or stems.

1005.4.3.2 Backfill for planting pits shall consist of the planting soil mixture as specified in these specifications. The plant shall be positioned in the hole and backfilled no more than halfway up the root ball. The backfilling shall be completed, and material tamped. When pit is nearly filled, water thoroughly and allow water to soak away. If settling of the backfill occurs after watering, add more backfill to bring to finish grade.

1005.5 MULCHING: Unless shown on the plans or specified otherwise, after completion of planting operations, a 4 inch thick layer of mulch shall be applied to all planting beds.

1005.6 MAINTENANCE AND PROTECTION:

Maintenance and protecting of trees, shrubs, and groundcover shall begin immediately following the last operation of installation for each plant and shall continue through the duration of the maintenance period specified for turf. If the project does not include turf, the trees, shrubs and groundcover shall be maintained for a period of 30 days after substantial completion. Maintenance shall include watering, weeding, cultivating, removal of dead material and debris, resetting of trees to upright positions, restoration of earth basins, and such other operations as may be necessary for the health of the planted stock and the general appearance of the landscaped areas. Protection shall include care of the

planted stock from damages resulting from trespass, erosion (including watering), weather, vandalism, disease and the like.

1005.6.1 PRUNING: The CONTRACTOR shall not prune any plant material except under the specific direction of the ENGINEER.

1005.6.2 WATER: The CONTRACTOR shall be responsible for the cost of water during the installation and maintenance of plant material until final acceptance.

1005.7 GUARANTEE:

All plant materials shall be guaranteed to be in a live, healthy, and normal growing condition following the date of acceptance by the ENGINEER through 12 months or one growing season whichever comes first. A growing season shall be defined as May 15 through September 15. Such plant materials that are dead or in an unhealthy, impaired growth condition, shall be replaced by the CONTRACTOR within 10 days after the end of the guarantee period.

1005.8 INSPECTIONS:

1005.8.1 The following inspections shall be the minimum required inspections during the course of construction. Additional inspections shall be made at any time at the discretion of the ENGINEER.

1005.8.2 It shall be the responsibility of the CONTRACTOR to notify the ENGINEER, in writing, 48 hours in advance of each required inspection.

1005.8.3 The sequence of required inspections shall not be changed from the sequence listed below. The CONTRACTOR shall not proceed with work of the next sequence without written approval of the work of the previous sequence. Payment will not be approved for items which have not been inspected and approved in writing.

1005.8.3.1 Inspect plant material at CONTRACTOR'S yard prior to delivery to job site.

1005.8.3.2 Inspect staked locations of material prior to planting.

1005.8.3.3 Inspect material at the job site prior to and during planting.

1005.8.3.4 Inspect at end of maintenance period.

1005.8.3.5 Final inspection of the project and acceptance.

1005.8.3.6 Inspect at end of growing season or 12 months, whichever comes first.

1005.9 MEASUREMENT AND PAYMENT:

1005.9.1 MEASUREMENT: The measurement

shall be made per each size of a particular species of tree, shrub and/or ground cover plant.

1005.9.2 PAYMENT: Payment shall be made at the contract unit price for each size of a particular species of plant as specified in the bid proposal or approved by the ENGINEER, which shall include all materials, equipment and labor required in furnishing and planting the landscape plants.

SECTION 1010
GRASS SODDING

1010 GENERAL

Work under this section consists of preparing all areas for grass sodding indicated on the plans furnishing and installing all sod, fertilizer and soil amendments in accordance with the plans and specifications or as authorized by the ENGINEER.

1010.2 REFERENCES

1010.3 MATERIALS

1010.3.1 GRASS SOD:

1010.3.1.1 Sod shall be a mixture of Olympic or falcon tall fescue and bluegrass unless otherwise specified on the plans. A sample of sod and a written submittal of the seed mix shall be submitted a minimum of 30 days prior to laying of sod. It shall be vigorous, well-rooted healthy turf free from disease, insect pests, weeds, other grasses, stones, and other harmful or deleterious matter.

1010.3.1.2 Sod shall be a cut by an approved mechanical sod cutter to a thickness of not more than 1 3/4 inch, or less than 1 1/2 inch. Sod pieces shall be cut a maximum of 19 inches wide. Handling of sod shall be done in a manner that will prevent tearing, breaking, drying, or any other damage. Sod shall be installed in place on the site not more than 24 hours after cutting.

1010.3.2 FERTILIZER: Fertilizer shall be a granular from starter fertilizer with a guaranteed analysis of 18-24-16.

1010.3.3 ORGANIC AMENDMENTS: Organic amendment shall consist of well aged screened bark fines from coniferous trees as available from Western Agricultural Products Co., or approved equal. Material shall be 1/2" minus with 90% passing a 1/4" screen. Amendment pH shall not exceed 6.5. Salinity shall not exceed 1.5 mnhos/cm. Percentage of organic matter shall not be less than 80% tested by simple combustion.

1010.4 SODDING OPERATION:

1010.4.1 PREPARATION: Prior to start of soil preparation all finish grades shall be established and approved as meeting the requirements of the grading plan. Apply a uniform one inch layer (3 C.Y./1000 square feet) of organic amendment and 4 lbs. of starter fertilizer per each 1000 square feet to the entire area to be sodded. After application of organic amendment and starter fertilizer all areas to be sodded shall be thoroughly rototilled to a minimum depth of 6 inches. After rototilling is

complete at cross directions, drag to an even grade, then roll for firmness.

1010.4.2 INSTALLATION:

1010.4.2.1 Before laying sod, the finish grade shall be brought to a firm, even surface, free from stones or lumps, in excess of one inch diameter, and shaped to provide drainage. The finish grade shall be inspected and approved by the ENGINEER prior to laying any sod.

1010.4.2.2 Lay sod over moistened soil lightly raking the soil ahead of each sod strip. Sod shall be laid across the slope with staggered joints. Pieces shall be fitted together tightly so that no joint is visible, and sod tamped firmly and evenly by hand. After all the sodding has been laid it shall be rolled with a hand roller.

1010.4.2.3 Water all sodded areas immediately after final rolling with a fine spray to a depth of 4 inches. Irrigate by means of the automatic underground irrigation system all sodded areas as often as necessary to promote healthy grass growth until a thick, even stand of grass has been obtained.

1010.4.2.4 Mow the lawn when the grass is over 2 inches tall, keeping lawn mower blades minimum 2 inches high for the first cutting.

1010.4.3 PROTECTION AND MAINTENANCE: Protection and maintenance shall continue for thirty days, or until the entire landscape project is accepted. Sod shall be maintained at a height of 2". The maximum height between cuttings shall not exceed 3". Final acceptance shall only occur after all sod is well rooted.

1010.4.3.1 WATER: The CONTRACTOR shall be responsible for the cost of water during the installation and maintenance of sod until final acceptance.

1010.5 INSPECTIONS:

1010.5.1 The following inspections shall be the minimum required inspections during the course of construction. Additional inspections shall be made any time at the discretion of the ENGINEER or OWNER.

1010.5.2 It shall be the responsibility of the CONTRACTOR to notify the ENGINEER in writing, 48 hours in advance of each required inspection.

1010.5.3 The sequence of required inspections shall not be changed from the sequence listed below. The CONTRACTOR shall not proceed with work of the next sequence without written approval of the

work of the previous sequence. Payment will not be approved for items which have not been inspected and approved in writing.

1010.5.3.1 Automatic irrigation system, if required, shall be installed, tested, and approved.

1010.5.3.2 Each phase of soil preparation shall be inspected in process.

1010.5.3.3 Finish grade shall be inspected.

1010.5.3.4 Sod shall be inspected prior to laying.

1010.5.3.5 Sod shall be inspected after completion.

1010.5.3.6 Sod shall be inspected at end of maintenance period.

1010.5.3.7 Final inspection of the project and acceptance.

1010.5.3.8 Sod shall be inspected 12 months after completion.

1010.6 MEASUREMENT AND PAYMENT:

1010.6.1 MEASUREMENT: The measurement of grass sodding shall be by the square foot or square yard as indicated in the bid proposal.

1010.6.2 PAYMENT: Payment shall be made at the contract unit price per square foot or square yard for grass sodding complete in place, which shall include all material, equipment and labor required in preparation, final grading and fertilizing the area to be sodded, sod, sod placement, watering and maintenance as specified herein.

SECTION 1011
TURF GRASS SEEDING

1011.1 GENERAL:

Work under this section consists of preparing all areas indicated on the plans for turf grass seeding and furnishing and installing all seed, fertilizer and soil amendments as specified herein and on the plans, or as authorized by the ENGINEER.

1011.2 REFERENCES:

1011.2.1 This publication:

Section 1001 Landscaping Irrigation

1011.3 MATERIALS:

1011.3.1 SEED:

1011.3.1.1 Turf grass seed shall consist of Falcon Fescue, Pennfine Perennial Rye, and Adelphi Blue Grass. The mixing ratio of the above listed grasses shall be 1:1:1 by weight. The ENGINEER shall receive all labels from seed bags for verification. Purity of seed shall not be less than 98% and germination shall not be less than 85%.

1011.3.1.2 Each bag of seed shall be sealed and labeled by the seed dealer in accordance with Federal Seed Laws and New Mexico Department of Agriculture Labeling Laws. This includes: variety, kind of seed, lot number, purity, germination, percent crop, percent inert, percent weed (including noxious weeds), origin, test data and net weight. Federal Seed laws require that analysis shall be no older than 5 months for seed shipped interstate and no older than 9 months for seed shipped intra-state.

1011.3.2 FERTILIZER: Fertilizer shall be granular form starter fertilizer with a guaranteed analysis of 18-24-16.

1011.3.3 ORGANIC AMENDMENTS: Organic amendment shall consist of well aged screened bark fines from coniferous trees as available from Western Agricultural Products Company. Material shall be 1/2" minus with 90% passing a 1/4" screen. Amendment pH shall not exceed 6.5. Salinity shall not exceed 1.5 mnhos/cm. Percentage of organic matter shall not be less than 80% tested by simple combustion.

1011.4 SEED BED PREPARATION:

1011.4.1 PREPARATION: Prior to start of soil preparation all finish grades shall be established and approved as meeting the requirements of the grading plan. Apply a uniform 1" layer of organic amendment and 4 lbs. of starter fertilizer per each 1000 square feet to the entire area to be seeded. After application of organic amendment and starter fertilizer all areas to be seeded shall be thoroughly rototilled to a minimum depth of 6 inches. After

rototilling is complete at cross directions, drag to an even grade, then roll for firmness. Before seeding, the finish grade shall be brought to a firm, even surface, free from stones or lumps in excess of one inch diameter, and shaped to provide drainage. The finish grade shall be inspected and approved by the ENGINEER prior to seeding.

1011.5 SEEDING FOR TURF

1011.5.1 GENERAL

1011.5.1.1 The seeding rate shall be 250 lbs. PLS per acre or as shown on the plans. The specific mix shall be uniformly applied over the area to be seeded.

1011.5.1.2 CONTRACTOR'S vehicles and other equipment shall not travel over the seeded areas. If, as determined by the ENGINEER, rain or some other factor occurs over prepared surfaces prior to seeding which prevents seeding to the proper depth, the CONTRACTOR shall again prepare the seed bed without additional compensation.

1011.5.2 TIME OF SEEDING: (SEEDING SEASON) Turf grass seeding shall only be accomplished in the Spring from April 1 through May 30 or in the Fall from August 15 through September 30. If seeding is not accomplished during the "time of seeding" the CONTRACTOR shall accomplish the seeding at the "time of seeding" during the next calendar year. Extension of the CONTRACT to meet the "time of seeding" shall be accomplished at no additional expense to the OWNER.

1011.5.2.1 All soil slopes which have been completed prior to the seeding season shall be seeded immediately after the opening of the current seeding season.

1011.5.2.2 All soil slopes which are completed during the seeding season shall be seeded that same season.

1011.5.3 DRILL SEEDING: All seed shall be drilled in cross directions, where practical, with 50% of the seed applied in each direction. The second pass of the seeder when seeding in cross directions shall be across the slope. In areas where seeding in cross directions is impractical, seeding shall be accomplished by drilling and shall be across the slope. Seed shall be planted approximately 1/4 inch deep, with a maximum depth of 1/2 inch unless otherwise specified on the plans. The distance between the drilled furrows shall not be more than 2 inches. Seeding shall be done with grass seeding equipment in good working order with double disc openers, depth bands, drop tubes, packer wheels or drag chains, rate control attachments, seed boxes with agitators for trashy seed.

1011.5.4 BROADCASTING: The seed will be broadcast by a mechanical spreader at a rate as specified or as indicated on the plans. Seeds shall be to a minimum depth of 1/4" depth and no more than a 1/2 of an inch. Broadcasting shall only be used when specified on the plans and/or approved by the ENGINEER.

1011.6 WATERING

1011.6.1 PERMANENT IRRIGATION SYSTEMS FOR TURF GRASSES: Seeded areas having a permanent irrigation system as specified on the plans will be watered by said system. Watering of the seed will be the responsibility of the CONTRACTOR. All seeded areas shall be watered immediately after completion of seeding, keeping the top two inches of soil evenly moist until seed has uniformly germinated and grown to a height of two inches.

1011.7 PROTECTION AND MAINTENANCE FOR SEEDED TURF: Protect and maintain all turf seeded areas until a dense uniform stand of grass has been established, which shall be defined as when the density of the turf is such that there are no bare areas of soil greater than three inches in diameter and the majority of the seeded area has no bare areas whatsoever. Additionally, the grass shall have been cut a minimum of three times at a height of 2 inches. After completion of second mowing, apply an additional 4 pounds per 1000 square feet of starter fertilizer.

1011.7.1 WATER: The CONTRACTOR shall be responsible for the cost of water during seeding and maintenance of seeded turf until final acceptance.

1011.8 INSPECTION FOR SEEDED TURF GRASSES:

1011.8.1 The following inspections shall be the minimum required inspections to seeded turf grass during the course of construction. Additional inspections shall be made at any time at the discretion of the ENGINEER or OWNER.

1011.8.2 It shall be the responsibility of the CONTRACTOR to notify the ENGINEER, in writing, 48 hours in advance of each required inspection.

1011.8.3 The sequence of required inspections shall not be changed from the sequence listed below. The CONTRACTOR shall not proceed with work of the next sequence without written approval of the work of the previous sequence. Payments will not be approved for items which have not been inspected and approved in writing.

1011.8.4. Automatic irrigation system where required shall be installed, tested, and approved in accordance with Section 1001, if required.

1011.8.5 Each phase of soil preparation shall be inspected in process.

1011.8.6 Finish grade shall be inspected.

1011.8.7 Seed shall be inspected prior to seeding.

1011.8.8 Seeded area shall be inspected after completion.

1011.8.9 Seeded area shall be inspected at the end of the maintenance period.

1011.8.10 Final inspection of the project and acceptance.

1011.9 MEASUREMENT AND PAYMENT

1011.9.1 MEASUREMENT: The measurement of turf grass seeding shall be by the acre.

1011.9.2 PAYMENT: Payment shall be made at the contract unit price per acre of turf grass seeding complete in place, which shall include the seed, fertilized, area preparation, seeding, watering, and maintenance.

SECTION 1012
NATIVE GRASS SEEDING

1012.1 GENERAL:

Work under this section consists of preparing all area indicated on the plans for native grass seeding, furnishing and installing all seed, fertilizer and soil amendments as specified herein and on the plans, or as authorized by the ENGINEER.

1012.2 REFERENCES:

1012.2.1 This Publication:

Section 1011 Turf Grass Seeding

1012.3 WORK AREA/TIMING:

1012.3.1 Areas that are disturbed by the CONTRACTOR that are outside the construction limits shown on the plans or authorized by the ENGINEER shall be seeded with native grasses as specified herein at no cost to the OWNER.

1012.3.2 The seeding of disturbed areas shall commence upon completion of the other work in the area.

1012.4 MATERIALS:

1012.4.1 Native Seed: The native seed species and rate of application shall be as shown below and shall be used based on the type of soil or as specified on the plans or in the Supplemental Technical Specification.

1012.4.1.1 Sandy Soils: (mainly west side areas). Seed rate is given in pounds of pure live seed (P.L.S.) per acre.

<u>Variety/ Common Name</u>	<u>Genus/ Species</u>	<u>P.L.S./Acre</u>
"Paloma" Indian rice grass	Oryzopsis hymenoides	5.0
"Viva" Galleta grass	Hilaria jamesii	1.0
"Niner" Side oats grama	Bouteloua curtipendula	3.0
"Hatchita" Blue grama	Bouteloua gracilis	1.0
Sand dropseed (NM Region)	Sporobolus cryptandrus	1.0
Fourwing saltbush (NM Region)	Atriplex canescens (de-winged)	1.0

Total rate 12.0 lbs/acre

1012.4.1.2 Clay, Clay Loam, and Sandy gravelly clay loam soils: (mainly valley and east side areas). Seed rate is given in pounds of pure live seed (P.L.S.) per acre.

<u>Common Name</u>	<u>Genus-species</u>	<u>PLS/acre</u>
"Paloma" Indian rice grass	Oryzopsis hymenoides	2.0
"Viva" Galleta grass	Hilaria jamesii	2.0
"Niner" Sideoats grama	Bouteloua curti pendula	2.0
"Hatchita" Blue grama	Bouteloua gracilis	3.0
Sand dropseed (NM Region)	Sporobolus cryptandrus	1.0
Four-wing saltbush (NM Region)	Atriplex canescens (de-winged)	1.0

Total rate 11.0 lbs/ac

NOTE: If the area to be seeded is along a recreational trail of any type the seed mixes for either type of soil listed above shall exclude the one (1) pound per acre of Four-wing saltbush. The seeding rate shall be lowered by one (1) pound per acre.

1012.4.1.3 Seeds may be pre-mixed by a seed dealer. Each bag of seed shall be sealed and labeled by the seed dealer in accordance with Federal Seed Laws and New Mexico Department of Agriculture Labeling Laws. This includes: variety, kind of seed, lot number, purity, germination, percent crop, percent inert, percent weed (including noxious weeds), origin, test data and net weight. Federal Seed Laws require that analysis shall be no older than 5 months for seed shipped interstate and no older than 9 months for seed shipped intra-state. The ENGINEER shall receive all labels from all bags of seed used for verification.

1012.4.2 Fertilizer and Soil Amendments: Unless otherwise specified on the plans or in the Supplemental Technical Specification, no fertilizer or other soil amendments are required on areas specified to receive native seeding. If fertilizer and/or other soil amendments are required they shall be in accordance with Section 1011 of these specifications.

1012.4.3 MULCH:

1012.4.3.1 Hay Mulch: Perennial native or introduced grasses of fine-stemmed varieties shall be used unless otherwise specified on the plans. At least 65 percent of the herbage by weight of each bale of hay shall be 10 inches in length or longer. Hay with noxious seed or plants will not be acceptable. Rotted, brittle, or moldy hay will not be acceptable. Marsh grass or prairie hay composed of native grass of species to be seeded will be acceptable. Tall wheat grass, intermediate wheat grass, switch grass, or orchard hay will be acceptable if cut prior to seed formation. Marsh grass hay shall be composed of mid and tall native, usually tough and wiry grass and grass-like plants found in the lowland areas within the Rocky Mountain region. Hay shall be properly cured prior to use. Hay which is brittle, short fibered or improperly cured is not acceptable.

1012.5.2 Straw Mulch: Small grain such as wheat, barley, rye, or oats will not be allowed except by prior approval of the ENGINEER and with the concurrence of the Air Division, Environmental Health Department. Alfalfa or the stalks of corn, maize or sorghum is not acceptable. Material which is brittle, shorter than 10 inches or which breaks or fragments during the crimping operation will not be acceptable.

1012.4.3.3 Gravel Mulch: Gravel mulch shall be crushed or screened gravel 3/4" to 1" maximum size with a minimum of one angular face unless otherwise specified.

1012.4.3.4 Erosion Control Mats, Fabric or Blankets: The type of erosion control mats, fabric or blankets used shall be as specified or allowed on the plans or in the Supplemental Technical Specifications.

1012.5 SEED BED PREPARATION:

1012.5.1 General:

1012.5.1.1 Prior to the starting of any seed bed preparation the final grades of all earth work shall be inspected and approved by the ENGINEER.

1012.5.1.2 No preparation shall be performed when the surface is wet or muddy or when the soil moisture content is such that the soil is not fully loosened by the discing operation.

1012.5.1.3 The extent of seed bed preparation shall not exceed the area on which seeding, mulching and crimping operations can be completed prior to crusting or wind or water erosion of the prepared surface - if erosion, crusting or re-compaction occurs, the affected area shall be re-worked beginning with seed bed preparation. Depth of preparation must be approved by the ENGINEER prior to the seeding and mulching operations.

1012.5.2 Mechanical Preparation: The seed bed shall be loosened to a minimum depth of 6" (six inches) by means of disc or harrow. Area of heavy or compacted soil may require additional preparation such as chiseling or ripping if discing alone does not result in preparation to the full minimum depth of 6". The soil shall be worked to a smooth surface free of clods, stones 4" and larger or any other debris or foreign material that could interfere with seeding or crimping equipment operations.

1012.5.3 Hand Preparation: Areas which cannot be prepared with mechanized equipment because of small size irregular shape or slope angle may be prepared to a minimum depth of 2" using hand tools or a rototiller. Any such areas will be specified on the plans.

1012.6 SEEDING:

1012.6.1 General:

1012.6.1.1 Seeding shall not start until the seed bed preparation has been inspected and approved by the ENGINEER.

1012.6.1.2 No more area may be seeded than can be covered with mulch and crimped, or covered with gravel mulch or erosion control mats by the end of the work day. No seeding operations may be conducted when steady wind speed exceeds 10 miles per hour. If winds exceed 10 mph while seeding is underway, seeding operations will be halted and any areas seeded to that point completed.

1012.6.2 Seed Application:

1012.6.2.1 Drill Seeding: Drill seeding is required unless otherwise specified on the plans or in the Supplemental Technical Specifications. Seed shall be applied with a "rangeland" type seed drill equipped with packer wheels. Seed shall be drilled to a maximum depth of 1/2" unless otherwise specified. Direction of seeding shall be across slopes and on the contour whenever possible.

1012.6.2.2 Broadcast Seeding: Seed may be applied using the broadcast method when size, irregular shape or slope angle exceeding 3:1 prevents the use of a seed drill. Seed may be broadcast by hand or by means of a mechanical seeder provided that the seed is evenly distributed over the seeding area. Areas of broadcast seeding will be hand raked to cover seed. Areas which are broadcast seeded shall be seeded at rate which is double that used for drill seeding.

1012.6.2.3 Seeding With Gravel Mulch: Areas to receive gravel mulch will be seeded at the broadcast seed rate with 1/2 the seed applied prior to application of gravel and 1/2 the seed applied on the surface of the gravel. Water shall be applied in quantity sufficient to wash seed from the surface and into the gravel.

1012.6.2.4 Hydro Seeding: Hydro seeding will not be allowed on areas of non-irrigated native grass seeding unless specified on the plans or in the Supplemental Technical Specifications or authorized by the ENGINEER.

1012.7 MULCHING:

1012.7.1 General:

1012.7.1.1 All seeded areas shall be mulched unless otherwise specified on the plans or in the Supplemental Technical Specifications.

1012.7.1.2 On seeded areas that are level or have slopes 3:1 or less, any of the four (4) types of mulching or erosion control specified herein may be used. On seeded areas that have slopes steeper than 3:1 only gravel mulch or erosion control materials may be used as specified on the plans and in the Supplemental Technical Specifications.

1012.7.2 Hay Mulch: Hay mulch shall be applied at a minimum rate of 1.5 tons per acre of air dry hay.

1012.7.3 Straw Mulch: Straw mulch shall be applied at a minimum rate of 2.5 tons per acre of air dry straw.

1012.7.4 Crimping: Hay and/or Straw mulch shall be crimped into the soil. The mulch shall be spread uniformly over the area either by hand or with a mechanical mulch spreader. When spread by hand, the bales of mulch shall be torn apart and fluffed before spreading. Mulching will not be permitted when wind velocity exceeds 15 miles per hour. The mulch shall be wetted down and allowed to soften for 15 to 20 minutes prior to crimping. A heavy disc such as a mulch-tiller, with flat serrated discs at least 1/4 inch in thickness, having dull edges and the disc spaced 6 inches to 8 inches apart shall be used to crimp (or anchor) the mulch into the soil to a minimum depth of 2 inches or as specified on the plans or the Supplemental Technical Specifications. The discs shall be of sufficient diameter to prevent the frame of the equipment from dragging the mulch.

The crimping operations shall be across the slope where practical but not be parallel to prevailing Westerly winds (270 degrees magnetic). Crimping shall be in a general north-south direction or by tight interlocking "S" curves to avoid straight east-west crimp lines.

If small grain straw mulch is used it shall be crimped in two (2) directions in a cross-hatch pattern.

1012.7.5 Gravel Mulch: Gravel mulch shall be placed by hand or by mechanized equipment that provides full coverage at a uniform thickness of 2 inches in depth.

1012.7.6 Erosion Control Mats, Fabric or Blankets: the type of erosion control mats, fabric or blankets used shall be as specified on the plans or the Supplemental Technical Specifications or as approved by the ENGINEER. The anchoring of the erosion control items shall be as per the manufacturer's recommendations.

1012.8 PROTECTION OF NATIVE GRASS SEEDED AREA:

1012.8.1 GENERAL: The CONTRACTOR shall be responsible for protecting and caring for seeded areas until final acceptance of the work and shall repair at his expense any damage to seeded areas caused by pedestrian or vehicular traffic or vandalism.

1012.9 INSPECTION FOR NATIVE GRASS AREA:

1012.9.1 The following inspection shall be the minimum required inspections to native grass during the course of construction. Additional inspections shall be made at any time at the discretion of the ENGINEER.

1012.9.2 It shall be the responsibility of the CONTRACTOR to notify the ENGINEER, in writing, 48 hours in advance of each required inspection.

1012.9.3 The sequence of required inspections shall not be changed from the sequence listed below. The CONTRACTOR shall not proceed with work of the next sequence without written approval of the work of the previous sequence. Payment will not be approved for items which have not been inspected and approved in writing.

1012.9.3.1 Each phase of soil preparation shall be inspected in process.

1012.9.3.2 Finish grade shall be inspected.

1012.9.3.3 Seed shall be inspected prior to seeding.

1012.9.3.4 Seeded area shall be inspected after completion.

1012.9.3.5 Final inspection of the project and acceptance.

1012.10 MEASUREMENT AND PAYMENT

1012.10.1 MEASUREMENT: The measurement of native grass seeding shall be by the acre.

1012.10.2 Payment: Payment shall be made at the contract unit price per acre of native grass seeding complete in place, which shall include the seed, fertilizer, (if required) area preparation, seeding, soil amendments, (if required) and mulching.

SECTION 1015
TRASH AND LITTER RECEPTACLES

1015.1 GENERAL

Work under this section consists of the furnishing and installation of trash and litter receptacles including the furnishing of all associated labor, equipment and materials in accordance with the plans and specifications.

1015.2 REFERENCES

1015.3 MATERIALS AND EXECUTION

1015.3.1 Each item shall be new and without flaws or defects of any type and shall be the best of their class and kind. Each items shall be of the brand and type as noted in the specifications and on the drawings, or an approved equal.

1015.3.2 Trash receptacles shall be Rinconada III trash receptacles (TR-3329-III) with front-opening fiberglass door or approved equal. Concrete Specifications: 4000 28-day compressive strength (minimum), 4-7% entrained air, mild steel reinforcing as required, polypropylene fiber secondary reinforcing, smooth surface fiberglass forms, integral color as specified on the drawings, finish smooth as cast. Receptacles shall be as manufactured by Materials, Inc., Albuquerque, New Mexico, or approved equal.

1015.3.3 Each item specified is equipment manufactured by specific companies and has been approved by the Landscape Architect and the City of Albuquerque, Parks and General Services, Design Development and Maintenance Divisions. Approved equal equipment or other manufacturers may be used only with the written approval of the Landscape Architect and submittals for approved equal equipment shall be presented no later than five (5) days prior to the opening of the bids.

1015.4 INSTALLATION

Receptacles shall be located as shown on plans or as directed by the Landscape Architect.

1015.5 MEASUREMENT AND PAYMENT

Measurement and payment will be the unit price per each for the class and type required as specified in the Bid Proposal.